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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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EXAMINER	
ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No.	Applicant(s)	
	09/234,233	LI ET AL.	
	Examiner	Art Unit	
	DAVID VU	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

1)☐ Responsive to communication(s) filed on *10/29/99* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a)☐ All b)☐ Some * c)☐ None of the CERTIFIED copies of the priority documents have been:

1.☐ received.

2.☐ received in Application No. (Series Code / Serial Number) _____ .

3.☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
18) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 25-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Weidman et al. (Applied Physics Letter, vol.62,no.4,January 25,1993, pgs.372-374).

Weidman et al shows a semiconductor processing method, comprising:

forming a layer of $Si(OH)_4$ over a substrate;

exposing some portions of the layer to energy while leaving other portions unexposed, the exposing converting the exposed portions to SiO_2; and

after the exposing, subjecting the exposed and unexposed portions of the layer to hydrofluoric acid to selectively remove the $Si(OH)_4$ of the unexposed portions relative to the SiO_2 of the exposed portions.

As to claim 26, Weidman et al. show the energy is in the form of ultraviolet light.

As to claim 27, Weidman et al. show the energy is in the form of ultraviolet light and is passed onto the layer of $Si(OH)_4$ through openings in a patterned mask.

As to claim 28, Weidman et al. show the energy is in the form of an electron beam.

As to claim 29, Weidman et al. show the substrate is a semiconductive wafer, and further comprising:

after the selective removal of the $Si(OH)_4$ Of the unexposed portions, and while the SiO_2 of the exposed portions remains over the substrate, cutting the wafer into separated die.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joubert et al (EP 0 942 330 A1) in view of Weidman et al. (Applied Physics Letter,

vol.62,no.4,January 25,1993, pgs.372-374), and further in view of Weidman et al. (Jounal of Photopolymer Science and Technology; Vol.8, No.4, 1995, 679-686).

Regarding claim1, Joubert et al. disclose all claimed subject matter, but omits the step of:

after the exposing, subjecting the exposed and unexposed portions of the layer to common conditions, the common conditions being effective to remove the material and comprising a rate of removal that is influenced by the altered physical properties of the layer, the common conditions removing either the exposed or unexposed portions faster than the other of the exposed and unexposed portions; and

after the selective removal of the exposed or unexposed portions,and while the other of the exposed and unexposed portions remains over the substrate, cutting the wafer into separated die.

Joubert et al. show a semiconductor processing method, comprising:

forming a layer of material over a semiconductive wafer substrate;

exposing some portions of the layer to energy while leaving other portions unexposed, the exposing altering physical properties of the exposed portions of material relative to the unexposed portions of material; (EP 0942330A1, Col.4, Lines.8-18)

However, Weidman et al.(Jounal of Photopolymer Science and Technology; Vol.8, No.4, 1995, Page 681) show step of:

after the exposing, subjecting the exposed and unexposed portions of the layer to common conditions, the common conditions being effective to remove the material

and comprising a rate of removal that is influenced by the altered physical properties of the layer, the common conditions removing either the exposed or unexposed portions faster than the other of the exposed and unexposed portions; and

after the selective removal of the exposed or unexposed portions, and while the other of the exposed and unexposed portions remains over the substrate, cutting the wafer into separated die. One of ordinary skill in the art would have readily recognized the advantage and desirability to combine Joubert et al. by using Weidman et al.(Jounal of Photopolymer Science and Technology; Vol.8, No.4, 1995, Page.681) in order to obtain the best results.

Regarding claims 2&3, Weidman et al.(Jounal of Photopolymer Science and Technology; Vol.8, No.4, 1995, Pages 681-682) show the method of claim 1 wherein the material comprises carbon, silicon and oxygen.

Regarding claim 4, Weidman et al.(Jounal of Photopolymer Science and Technology; Vol.8, No.4, 1995, Pages 681-682) show the material comprises silicon bound to a hydrocarbon group and bound to oxygen.

Regarding claims 5&6, Weidman et al. (Applied Physics Letter, vol.62,no.4,January 25,1993, pages.372-373) show the material comprises $(CH_3)_ySi(OH)_{4-y}$ with y being greater than 0 and less than 4, and the material comprises $Si(OH)_4$.

Regarding claims 7-9, Weidman et al. (Applied Physics Letter, vol.62,no.4,January 25,1993, pages.372-373) show the energy is in the form of

ultraviolet light, the energy is in the form of an electron beam and the energy is in the form of a plasma.

3. Claims 10-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joubert et al (EP 0 942 330 A1) in view of Weidman et al. (Applied Physics Letter, vol.62,no.4,January 25,1993, pgs.372-374), and further in view of Weidman et al. (Jounal of Photopolymer Science and Technology; Vol.8, No.4, 1995, 679-686).

Regarding claim 10, Joubert et al. disclose all claimed subject matter, but omits the step of:

after the exposing, subjecting the exposed and unexposed portions of the layer to common conditions, the common conditions being effective to remove the silicon-comprising material and comprising a rate of removal that is influenced by the altered physical properties of the layer, the common conditions removing either the exposed or unexposed portions faster than the other of the exposed and unexposed portions.

Joubert et al. (EP 0 942 330 A1; Col.4, Lines 8-18) show a semiconductor processing method, comprising:

forming a layer of a silicon comp rising material over a substrate;

exposing some portions of the layer to energy while leaving other portions unexposed, the exposing altering physical properties of the exposed portions relative to the unexposed portions.

However, Weidman et al.(Jounal of Photopolymer Science and Technology; Vol.8, No.4, 1995, Page.681) show the step:

after the exposing, subjecting the exposed and unexposed portions of the layer to common conditions, the common conditions being effective to remove the silicon comprising material and comprising a rate of removal that is influenced by the altered physical properties of the layer, the common conditions removing either the exposed or unexposed portions faster than the other of the exposed and unexposed portions. One of ordinary skill in the art would have readily recognized the advantage and desirability to combine Joubert et al. by using Weidman et al.(Jounal of Photopolymer Science and Technology; Vol.8, No.4, 1995, Page.681) in order to obtain the best results.

Regarding claim 11, Weidman et al.(Jounal of Photopolymer Science and Technology; Vol.8, No.4, 1995, Pages.681-682) show the silicon-comprising material comprises carbon, silicon and oxygen.

Regarding claim 12, Weidman et al.(Jounal of Photopolymer Science and Technology; Vol.8, No.4, 1995, Pages.681-682) show the silicon-comprising material comprises silicon bound to a hydrocarbon group and bound to oxygen.

Regarding claim 13, Weidman et al. (Applied Physics Letter, vol.62,no.4,January 25,1993, pgs.372-373) show the silicon-comprising material comprises silicon bound to a hydrocarbon group and bound to oxygen, and wherein the hydrocarbon group does not comprise a carbon containing ring.

Regarding claim 14, Weidman et al. (Applied Physics Letter, vol.62,no.4,January 25,1993, pgs.372-373) show the silicon –comprising material comprises $(CH_3)_ySi(OH)_{4-y}$ with y being greater than 0 and less than 4.

Regarding claim 15, Weidman et al. (Applied Physics Letter, vol.62,no.4,January 25,1993, pgs.372-373) show the silicon-comprising material comprises Si(OH)4.

Regarding claims 16-18, Weidman et al. (Applied Physics Letter, vol.62,no.4,January 25,1993, pages.372-373) show the energy is in the form of ultraviolet light, the energy is in the form of an electron beam and the energy is in the form of a plasma.

Regarding claim 19, Weidman et al. (Applied Physics Letter, vol.62,no.4,January 25,1993, pages.372-373) show the silicon-comprising material comprises $(CH_3)_ySi(OH)_{4-y}$ with y being greater than 0 and less than 4 and the energy is in the form of ultraviolet light.

Joubert et al. (EP 0 942 330 A1; Col.4, Lines 8-18) show the exposing comprises passing the ultraviolet light through openings in a patterned mask and onto the layer of material to expose some portions of the layer to the ultraviolet light while leaving other portions unexposed.

Weidman et al.(Jounal of Photopolymer Science and Technology; Vol.8, No.4, 1995, Page.681) show the common conditions comprising subjecting the entire layer to Hydrofluoric acid, the hydrofluoric acid removing portions of the layer that were not

exposed to ultraviolet light at a faster rate than portions of the layer that were exposed to ultraviolet light.

Regarding claim 20, Weidman et al. (Applied Physics Letter, vol.62,no.4,January 25,1993, pages.372-373) show the silicon-comprising material comprises Si(OH)4 and the energy is in the form of ultraviolet light.

Joubert et al. (EP 0 942 330 A1; Fig.1A-1D) show the exposing comprises passing the ultraviolet light through openings in a patterned mask and onto the layer of material to expose said some portions of the layer to the ultraviolet light while leaving said other portions unexposed

Weidman et al. (Applied Physics Letter, vol.62,no.4,January 25,1993, pg.372) the common conditions comprising subjecting the entire layer to a solvent comprising hydrofluoric acid, the hydrofluoric acid removing portions of the layer that were not exposed to ultraviolet light at a faster rate than portions of the layer that were exposed to ultraviolet light.

Regarding claim 21, Weidman et al. (Applied Physics Letter, vol.62,no.4,January 25,1993, pages.372-373) show the silicon-comprising material comprises Si(OH)4 and the energy is in the form of an electron beam.

Joubert et al. (EP 0 942 330 A1; Fig.1A-1D) show the exposing comprises exposing said some portions of the layer to the electron beam while leaving said other portions unexposed.

Weidman et al. (Applied Physics Letter, vol.62,no.4,January 25,1993, page.372) show the common conditions comprising subjecting the entire layer to hydrofluoric acid, the hydrofluoric acid removing portions of the layer that were not exposed to the electron beam at a faster rate than portions of the layer that were exposed to the electron beam.

4. Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weidman et al.(Jounal of Photopolymer Science and Technology; Vol.8, No.4, 1995, 679-686) in view of Weidman et al. (Applied Physics Letter, vol.62,no.4,January 25,1993, pg.372)

Regarding claim 22, Weidman et al. (Jounal of Photopolymer Science and Technology; Vol.8, No.4, 1995, page.685, Fig.2&8) disclose all claimed subject matter, but omits the step of:

after the exposing, subjecting the exposed and unexposed portions of the layer to hydrofluoric acid to selectively remove the $(CH_3)_ySi(OH)_{4-y}$ of the unexposed portions relative to the $(CH_3)_xSiO_{2-x}$ of the exposed portions.

Weidman et al. (Jounal of Photopolymer Science and Technology; Vol.8, No.4, 1995, page. 685, Fig.2&8) show a semiconductor processing method, comprising:

forming a layer of $(CH_3)_ySi(OH)_{4-y}$ with y being greater than 0 and less than 4, over a substrate;

exposing some portions of the layer to ultraviolet light while leaving other portions unexposed, the exposing converting the exposed portions to $(CH_3)_xSiO_{2-x}$ with x being greater than 0 and less than 2.

However, Weidman et al. (Applied Physics Letter, vol.62,no.4,January 25,1993, pg.272) show after the exposing, subjecting the exposed and unexposed portions of the layer to hydrofluoric acid to selectively remove the $(CH_3)_ySi(OH)_{4-y}$ of the unexposed portions relative to the $(CH_3)_xSiO_{2-x}$ of the exposed portions. One of ordinary skill in the art would have readily recognized the advantage and desirability to combine Weidman et al.(Jounal of Photopolymer Science and Technology; Vol.8, No.4, 1995, Page.685, Fig.2&8) by using Weidman et al. (Applied Physics Letter, vol.62,no.4,January 25,1993, pg.272) in order to obtain the best results.

Regarding claim 23, Weidman et al.(Jounal of Photopolymer Science and Technology; Vol.8, No.4, 1995, Page.685, Fig.2&8) show the ultraviolet light is passed onto the layer of $(CH_3)_ySi(OH)_{4-y}$ through openings in a patterned mask.

Regarding claim 24, Weidman et al.(Jounal of Photopolymer Science and Technology; Vol.8, No.4, 1995, Page.685, Fig.2&8) show the substrate is a semiconductive wafer, and further comprising: after the selective removal of the $(CH_3)_ySi(OH)_{4-y}$ of the unexposed portions, and while the $(CH_3)_xSiO_{2-x}$ of the exposed portions remains over the substrate, cutting the wafer into separated die.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Vu whose telephone number is (703) 305-0391. The examiner can normally be reached on Monday-Friday from 8:00am to 5:00pm. If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms., can be reached on (703) 308-4910.

David Nelms
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David Vu DV
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